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A
SHORT ACCOUNT
OF A
COURSE
OF
MECHANICAL *and* EXPERIMENTAL Philoſophy and Aſtronomy.

BRITISH MUSEUM

In which will be exhibited the Experiments
Neceſſary for the Explanation
of
Natural PHILOSOPHY in General,
Or the Pproperties of MATTER, and
the Laws by which it acts;
Consisting of the following Parts,

I. Mechanics.
II. Hydrostatics.
III. Optics.
IV. Pneumatics.
V. Astronomy.
VI. Uſe of the Globes.

To be performed at K

By THO. PEAT, *Surveyor* and *Accomptant.*

☞ The Instruments made Uſe of to illuſtrate theſe Experiments are exceeding curious, beautiful, accurate and compleat. Particularly a fine Orrery, as improv'd by Meſſrs. Cole and Son, Succeſſors to Mr. Wright, Mathematical Inſtrument Maker to His Majesty. A curious Model of a Fire Engine; a Friction Machine, &c.

This Courſe will conſiſt of Fourteen Lectures, each of which will take up about two Hours, and be continued twice or thrice a Week, on ſuch Days and at ſuch Hours, as ſhall be agreed on by the Majority of the Auditors at the firſt Lecture.

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To the Candid READER.

THE Advantages which have accrued to the World from EXPERIMENTAL PHILOSOPHY, appear in the frequent Improvements now made in all thoſe Things which ſupply the Neceſſities, or ſerve the Conveniencies of Mankind: It's Uſes are ſo extenſive, that there is not a ſingle Art or Science to the Advantage of which it may not be applied. A ſtrict Inſpection therefore into the grand Diſcoveries founded thereon, which are of ſo great Conſequence to Society, is ſufficient to induce us to eſteem it, as the moſt effectual Means ſpeedily to improve all Arts and Sciences, to diſcover Cauſes from their Effects, and to make Art and Nature conſpire in Subſerviency to the Neceſſities, Conveniencies and Ornaments of Life, all which may be better underſtood by *ſeeing* the EXPERIMENTS performed than by a long and tedious Application to *Books* only.

The greateſt Care will be taken in this Courſe to render the Experiments as plain and intelligible as poſſible, even to thoſe who have not applied much Time or ſtudy this way: And thoſe Gentlemen and Ladies, who are pleaſed to give their generous Encouragement, will always receive the moſt grateful Acknowledgments from

Their Obedient Humble Servant,

THOMAS PEAT.

The Charge of attending this Courſe is one Guinea to each Subſcriber.—And, if any of the Subſcribers ſhall happen not to be *clear* in any of the Experiments which ſhall be made in the LECTURES; they may have ſuch Experiments repeated the next Day, between the Hours of Twelve and One, *Gratis*.

A
Courſe of *Lectures*,
IN
MECHANICAL *and* EXPERIMENTAL
PHILOSOPHY.

LECTURE I. MECHANICS.

OF Philoſophy in general.
Of Matter; its Extenſion, Diviſibility, and other Attributes.
The univerſal Law of Gravitation explained.
Attraction, and Repulſion; Shewn by Experiments.
The Law of Coheſion, or the Attraction of the ſmall Parts of Bodies; deduced from the Aſcent of Fluids in ſmall Tubes, and between Glaſs Planes; with other Experiments of that Nature.
Of Magnetiſm, with ſeveral Experiments made by natural and artificial Magnets.
Motion, in general explained.
Velocity diſtinguiſhed from Motion.
To find the Centres of Gravity in all Bodies; and to diſtinguiſh it, from the Centre of Magnitude, and the Centre of Motion.

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LECTURE II. MECHANICS *continued.*

AN heavy Body that would fall, hindered from falling, by adding an heavier Body to it.
Of Bodies that appear to Roll upwards.
That others will actually Roll upwards.

Experiments ſhewing why leaning Towers, &c. do not fall.

Of the three Laws of Nature; or Sir ISAAC NEWTON's Laws of Motion.

The Deſcent of Bodies on inclined Planes.

Experiments concerning Pendulums; and how their Motion may be altered by Heat and Cold.

The Centres of Oſſcillation, and Percuſſion explained.

The Cycloid deſcribed, and Bodies moving in that Curve.

Of the Elaſticity of Bodies.

Of the expanding of Metals by Heat, and contracting by Cold, ſhewn by the Pyrometer; being an Inſtrument that meaſures the Expanſion to the 20,000 Part of an Inch.

A curious Machine, to ſhew what quantity of *Friction* is on different Surfaces; and how to diminiſh it in the Axis of Wheels, or other moving Bodies: being a very uſeful Part of Mechanical Knowledge.

An Experiment to ſhew, that the Velocities of falling Bodies, is as the Times and the Spaces gone through; to the Spaces of the Times in falling.

LECTURE III.

Of the MECHANIC *Powers.*

OF the ſeveral Kinds of Levers.

Of Levers combin'd to propagate Motion to a Diſtance.

Of Balances: Whence the Conſtruction of Scales, and Steel-Yard.

Of deceitful Scales, and the Way to diſcover them.

The proportional Balances.

The *Chineſe* Dotchines explained.

The Wedge, Screw, and inclin'd Plane, &c. their Power demonſtrated from the Principle of the Lever.

Of Pulleys; ſingle, and combin'd; their Friction and Uſes.

Of the Wheel, and Axle.

Experiments to ſhew the Nature of common Wheel Carriages and how they may be loaded with the greateſt Eaſe to the Horſes by which the Abſurdity of the common Method of Loading will be demonſtrated; and proved by the Principles of Mechanics, that it is contrary to Reaſon and Experience: The Manner, and Poſition of the Wheels of Carriages, with the Line of Traction will be fully prov'd by Experiments.

LECTURE IV.

LECTURE IV. *Compound Engines.*

AND the general Method of computing the Power of any compound Machine, ſhewn by a complex Machine, made up of all the ſimple Machines.

Of the Impoſibility of perpetual Motion; and how Perſons may be deceived in the Search after it.

Of the Reſiſtance of Mediums.

Of the Hinderances ariſing from Friction.

The Advantage of Friction Wheels.

A Model of a Crane, and its Force computed.

A Model of a Pile Driver (to be worked by Men.)

A Pile Driver, to be worked by Horſes; being a curious Model, of that made uſe of at WESTMINSTER *new* BRIDGE.

LECTURE V.

A curious Courſe of ELECTRICAL Experiments.

LECTURE VI.

HYDROSTATICS.

THE Uſes of Hydroſtatics; and of the Gravity, Preſſure, and Reſiſtance of Fluids in general.

That every Part of Fluids, preſſes, and gravitates on the Part on which it reſts; and that the Preſſure is not only propagated *downwards*, but *upwards*, and *ſideways* in all Directions; and that the Quantity of that Preſſure, is in Proportion to its Altitude, in all Parts of the containing Veſſel.

The Hydroſtatical Paradox explained, Experimentally.

The HYDROMETER; which ſheweth the Genuineſs, &c. of Liquors.

The Hydroſtatical Balance for determining the Specific Gravities of Metals, Ore's, &c.——*By this may be diſcovered any counterfeit Coin's.*

ARCHIMEDES's Propoſition: ſhewing *how* He diſcovered the Quantity of GOLD and SILVER in *Hiero's* Crown.

To find the Solidity of *Irregular* Bodies.

The Water Bellows.

That

That Water will riſe in Pipes, to the ſame Height from whence it was conveyed.

Of Reſervoirs and Fountains, with an Experiment to ſhew how High, and *why* Water will riſe in Fountains and oblique Jetts.

The Expence of Water from Reſervoirs, at equal Holes.

That projected Fluids move in the ſame Curve as projected Solids do.

Of the common Syphon or Crane.

Various Sorts of Syphons explained.

The Fountain of Attraction.

The Uſe of the Antiguggelar.

HIERO's Fountain.

The Fountain at Command.

LECTURE VII.

THE Conſtruction of all Sorts of Pumps, ſhewn by working Models of Glaſs and Braſs, *(viz.)*

The common Sucking and Lifting Pump.

The Sucking and Forcing Pump.

Of the Expanſion of Water.

Of the *Tantalus* CUP; ſhewing the Reaſon why ſome Ponds looſe all their Water when filled full.

The Diving Bell; with Dr. *Halley*'s Improvements: and the Method of letting out *foul*, and ſending in *freſh* Air.

A curious working Model of a Fire Engine, with other Experiments.

LECTURE VIII. OPTICS.

COncerning the Nature of Light. Of Viſion in general. An Experiment to prove this great Principle in CATOPTRICKS, that when *Rays* of the *Light* are reflected, the angle of Incidence is equal to the angle of Reflection.

Of plain Mirrors.

Of concave and convex Mirrors.

Of Lucid Bodies.

Of Opake Bodies.

That Light is a Body.

Of the ſeveral Sorts of the Rays of Light.

The ſeveral Sorts of Lenſes.

How

How to know a Lens from a piece of plane Glaſs.

Of Teleſcopes and Microſcopes. Refracting, and Reflecting.

LECTURE IX.

OF the Structure of the Eye.

Of the Aqueous, Vitreous, and Chryſtalline Humours.

Of the Optic Nerve, and Retina.

The Diſſection of the Eye, and a more particular Account of Viſion.

An Artificial Eye.

Experiments to ſhew how Short-Sighted, and old Eyes may be helped.

Anamorphoſis, or diſtorted Figures.

The Magic Lanthorn, with moving Figures.

LECTURE X.

THE firſt Day the Sun ſhines clear, the Experiment of the *Camera Obſcura* will be made; Likewiſe the Experiment of Sir ISAAC NEWTON's Theory of Light and Colours, with the Solar Microſcope. &c.

LECTURE XI.

Of PNEUMATICS.

THE Nature and Properties of the Air in general and the Atmoſphere.

That the Denſity of the Air decreaſes according to its Diſtance from the Surface of the Earth.

Of the Riſe of Vapours in the Air.

Of the Expanſion of the Air.

Air weighed in a Balance; and its Weight to that of Water, &c. computed.

The Conſtruction of Barometers, and their Uſe; or the riſing and falling of the Quickſilver in the Weather-Glaſs accounted for.

Of meaſuring the Heights of Mountains, and Depths of Mines by this Inſtrument.

To find what Quantity of Air preſſes upon our Bodies at any Time.
The Thermometer, and Hygrometer explained.
Bottles broke by the Weight of the Air.
And by the Spring of Air under Water.

LECTURE XII.

THE Motion of Liquors in Vacuo.
That Fire and Flame are fed by Air.
Experiments to ſhew how the Lungs of Animals are affected in rarify'd Air.
How Air is vitiated, and how purify'd: with the Cauſe and Cure of Damps, in Mines, &c.
The Effect of vitiated Air upon the Life of Animals.
Reſpiration ſhewn, by an Inſtrument to explain the Motion of the Lungs and Diaphragm in natural Reſpiration.
An Experiment to ſhew that when the Reſiſtance of the Air is taken away, all Bodies fall equally faſt.

LECTURE XIII.

CUPPING explained.
That Sound cannot be conveyed without Air.
A Fountain by the Spring of the Air.
A portable Vacuum.
The floating of drowned Bodies accounted for.
The Exploſion of Gunpowder, and Thunder accounted for.
Of condenſing Air.
The condenſing Engine explained.
Bottles broke by condenſed Air.
The famous Experiment with *Otto Guerick's* Hemiſpheres. &c.

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LECTURE XIV.

GEOGRAPHY and ASTRONOMY explained by the GLOBES and ORRERY.

FINIS.